



Dart Aerospace Ltd.
1270 Aberdeen St
Hawkesbury, ON
K6A 1K7
Canada

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D407-667-205TRN
Job Sheet 192356



Part No: D407-667-205TRN

Job Qty: 1 pcs

Part Name: Crosstube Turning Detail



Part Weight: 0 lbs

Status: New

Priority: Medium

Job Created: 3/21/19

Job Tracking No:

Due Date: 4/18/19

Created By: Marie Lajeunesse

Type: Stock

Description:

Note: DWG REV G IPP Rev:A 08-03-06 new issue DD verified by:ec IPP Rev B 08.04.02 Removed polish EC
verified by: DD IPP Rev:C 08-08-19 revE as per dwg DD verified by:EC

Ship Via:

Bill of Materials

Job Routing

Op No	Operation	Qty	Start Date	Due Date	Standard		Workcenter/Supplier		Sign-off
					Setup Hrs	Run Hrs	Workcenter / Supplier	Lead Time	
100	Mori Seiki TL-40 - 1	1 pcs	4/18/19	4/18/19	2.49	3.20	Mori Seiki TL-40 - 1		
110	QC 2	1 pcs	4/18/19	4/18/19	0.00	0.00	QC 2 - 1		
							QC 2 - 12		
							QC 2 - 14		
							QC 2 - 17		
							QC 2 - 19		
							QC 2 - 2		
							QC 2 - 20		
							QC 2 - 22		
							QC 2 - 23		
							QC 2 - 25		
							QC 2 - 32		
							QC 2 - 33		
							QC 2 - 35		
							QC 2 - 39		
							QC 2 - 4		
							QC 2 - 40		
							QC 2 - 44		
							QC 2 - 45		
							QC 2 - 48		
							QC 2 - 49		
							QC 2 - 50		
							QC 2 - 51		
							QC 2 - 52		
							QC 2 - 56		
							QC 2 - 57		
							QC 2 - 62		
							QC 2 - 63		
							QC 2 - 8		
							QC 2 - 66		

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					QC 2 - 64	
					QC 2 - 65	
					QC 2 - 5	
120	Mori Seiki TL-40 - 1 - B4B	1 pcs	4/18/19	0.00 0.00	Mori Seiki TL-40 - 1 - B4B	
130	QC 2	1 pcs	4/18/19	0.00 0.00	QC 2 - 1	
					QC 2 - 12	
					QC 2 - 14	
					QC 2 - 17	
					QC 2 - 19	
					QC 2 - 2	
					QC 2 - 20	
					QC 2 - 22	
					QC 2 - 23	
					QC 2 - 25	
					QC 2 - 32	
					QC 2 - 33	
					QC 2 - 35	
					QC 2 - 39	
					QC 2 - 4	
					QC 2 - 40	
					QC 2 - 44	
					QC 2 - 45	
					QC 2 - 48	
					QC 2 - 49	
					QC 2 - 50	
					QC 2 - 51	
					QC 2 - 52	
					QC 2 - 56	
					QC 2 - 57	
					QC 2 - 62	
					QC 2 - 63	
					QC 2 - 8	
					QC 2 - 66	
					QC 2 - 64	
					QC 2 - 65	
					QC 2 - 5	
140	QC 8	1 pcs	4/18/19	0.00 0.00	QC 8 - 12	
					QC 8 - 14	
					QC 8 - 17	
					QC 8 - 20	
					QC 8 - 25	
					QC 8 - 3	
					QC 8 - 32	
					QC 8 - 33	
					QC 8 - 35	
					QC 8 - 39	
					QC 8 - 4	
					QC 8 - 44	
					QC 8 - 45	
					QC 8 - 49	
					QC 8 - 58	
					QC 8 - 8	
					QC 8 - 9	
					QC 8 - 68	
					QC 8 - 67	
					QC 8 - 1 (A)	
					QC 8 - 47	
					QC 8 - 40	
					QC 8 - 52	

				QC 8 - 23	
145	Crosstubes - 2 - B4B	1 pcs	4/18/19	0.00 0.65	Crosstubes - 1 - B4B
					Crosstubes - 2 - B4B
					Crosstubes - 3 - B4B
					Crosstubes - 4 - B4B
150	Crosstubes - 3 - B4B	1 pcs	4/18/19	0.00 0.25	Crosstubes - 1 - B4B
					Crosstubes - 2 - B4B
					Crosstubes - 3 - B4B
					Crosstubes - 4 - B4B
160	QC 7	1 pcs	4/18/19	0.00 0.00	QC 7 - 10
					QC 7 - 13
					QC 7 - 14
					QC 7 - 15
					QC 7 - 17
					QC 7 - 18
					QC 7 - 19
					QC 7 - 2
					QC 7 - 28
					QC 7 - 3
					QC 7 - 30
					QC 7 - 34
					QC 7 - 36
					QC 7 - 37
					QC 7 - 41
					QC 7 - 47
					QC 7 - 48
					QC 7 - 51
					QC 7 - 58
					QC 7 - 59
					QC 7 - 60
					QC 7 - 9
					QC 7 - 68
					QC 7 - 50
					QC 7 - 67
					QC 7 - 40
170	Packaging 3-1 - Stock - B4B	1 pcs	4/18/19	0.00 0.00	Packaging 3 - 1 - B4B
					Packaging 3 - 2 - B4B
					Packaging 3 - 3 - B4B
					Packaging 3 - 4 - B4B
					Packaging 3 - 5 - B4B
					Packaging 3 - 6 - B4B
					Packaging 3 - 7 - B4B
					Packaging 3 - 8 - B4B
					Packaging 3 - 9 - B4B
					Packaging 3 - 10 - B4B
					Packaging 3 - 11 - B4B
					Packaging 3 - 12 - B4B
					Packaging 3 - 13 - B4B
					Packaging 3 - 14 - B4B
					Packaging 3 - 15 - B4B
					Packaging 3 - 16 - B4B
					Packaging 3 - 17 - B4B
					Packaging 3 - 18 - B4B
					Packaging 3 - 19 - B4B
					Packaging 3 - 20 - B4B
					Packaging 3 - 21 - B4B
					Packaging 3 - 22 - B4B
					Packaging 3 - 23 - B4B
					Packaging 3 - 24 - B4B

				Packaging 3 - 25 - B4B	
				Packaging 3 - 26 - B4B	
				Packaging 3 - 27 - B4B	
				Packaging 3 - 28 - B4B	
				Packaging 3 - 29 - B4B	
				Packaging 3 - 30 - B4B	
				Packaging 3 - 31 - B4B	
				Packaging 3 - 32 - B4B	
				Packaging 3 - 33 - B4B	
				Packaging 3 - 34 - B4B	
				Packaging 3 - 35 - B4B	
				Packaging 3 - 36 - B4B	
180 QC 21 - SA	1 pcs	4/18/19	0.00 0.00	QC 21 - SA - 21	
				QC 21 - SA - 70	
				QC 21 - SA - 53	

Part Op **100** - Mori Seiki CNC Lathe Large) 1-Fill tube with sand & install plugs DT8531 on both ends as per Folio FA248 3-Turn Descriptions: first side as per Folio FA248

110 - (QC2- Inspect parts off machine FAI/FAIB)

120 - (Mori Seiki CNC Lathe Large) 1-Turn second side as per Folio FA248 4-Scribe part # and batch # using vibrating stylus as per Dwg D407-667-245

130 - (QC2- Inspect parts off machine FAI/FAIB)

140 - (QC8- Inspect parts - second check)

145 - (Crosstubes) Grind off circumferential machining marks longitudinally.

150 - (Crosstubes) 1- handfinish X-TUBE INSIDE AND OUT 2- ACID ETCH X-TUBE INSIDE AND OUT. USE RED SCOTCH BRITE

160 - (QC7-Inspect Chemical Conversion Coat)

170 - Identify and stock in kanban rack

180 - (QC21- Final Inspection - Work Order Release)

Job BOM				
Part / Item	Component Name	Quantity	Operation	Container
D6011-115	Crosstube Material	1 pcs (1 ea)	100-Mori Seiki TL-40 - 1	5006659

Job Allocations				
Operation	Component Part	Required	Inventory	Allocated
100-Mori Seiki TL-40 - 1	D6011-115	1	61	0

Part Specifications	
Specifications could not be found.	

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CANADA
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Container No: S171273



Part: D407-667-205TRN

Job No: 192356

Serial No/Batch: S171273

Revision: G

Inspector:

Exp Date:

Instructions:

Date: 04/10/19

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DART AEROSPACE LTD		Work Order: 192356
Description: Crosstube Assembly		Part Number: D407-667-245
Inspection Dwg: D407-667-245 Rev: G		Page 1 of 2

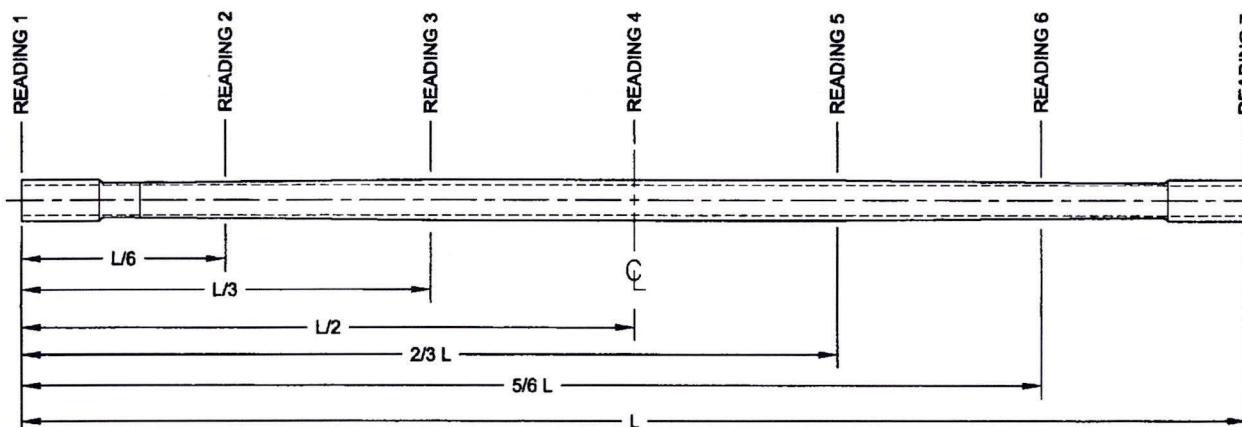
FIRST ARTICLE INSPECTION CHECKLIST

	Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.490	+0.005/-0.000					
	1.832	+0.005/-0.000					
	1.838	+0.005/-0.000					
	1.892	+0.005/-0.000					
	2.052	+0.005/-0.000					
	2.206	+0.005/-0.000					
	2.521	+0.005/-0.000					
	2.633	+0.005/-0.000					
	4.10	+/-0.030					
	4.978	+/-0.030					
	2.040	+0.000/-0.010	2.036	✓		cnc-08	
	0.125	+/-0.010					
	R0.063	+/-0.010					
	R0.500	+/-0.010					
SIDE B	2.490	+0.005/-0.000					
	1.832	+0.005/-0.000					
	1.838	+0.005/-0.000					
	1.892	+0.005/-0.000					
	2.052	+0.005/-0.000					
	2.206	+0.005/-0.000					
	2.521	+0.005/-0.000					
	2.633	+0.005/-0.000					
	4.10	+/-0.030					
	4.978	+/-0.030					
	2.040	+0.000/-0.010	2.050		✓	cnc-08	
	0.125	+/-0.010					
	R0.063	+/-0.010					
	R0.500	+/-0.010					
	112.91	+/-0.020					

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DART AEROSPACE LTD	Work Order: 192356
Description: Crosstube Assembly	Part Number: D407-667-245
Inspection Dwg: D407-667-245 Rev: G	Page 2 of 2

WALL THICKNESS MEASUREMENT



Location	WALL THICKNESS MEASUREMENT (IN)				Deviation Δw (max-min)	TOLERANCE
	w1	w2	w3	w4		
READING 1 L= 0"						0.075"
READING 2 L= 18.82						
READING 3 L= 37.64						
READING 4 L= 56.46						
READING 5 L= 75.27						
READING 6 L= 94.09						
READING 7 L= 112.91						

Calibration Result

Actual Block Thickness: 100-750

Sitescan 250 Measured Thickness: _____

Measured by: _____	Audited by: _____	Preliminary Approval: _____
Date: _____	Date: _____	Date: _____

Rev	Date	Change	Revised by	Approved
A	04.04.21	New Issue (P/O D407-667-205)	KJ/RF	
B	06.03.09	Dwg Rev updated	KJ/JLM	
C	06.03.30	Tolerance revised for 4.978 dimension	KJ/JLM	
D	07.02.19	Dwg Rev updated	KJ/JLM	
E	09.05.20	Dwg Rev updated	KJ	
F	12.06.04	Wall thickness form added	KJ	
G	15.05.14	Dwg Rev updated	KJ	

Item	QTY -245	PART NUMBER	DESCRIPTION
	X	D407-667-245	CROSSTUBE ASSEMBLY (407 HIGH AFT)
1	1	D6011-115	CROSSTUBE
2	2	D2873-043	NUT PLATE
3	2	D2873-045	NUT PLATE
4	1	D2894-1	SUPPORT
5	2	D3190-1	CHAFING SHIELD
6	2	D3595-063-430	RUBBER CUSHION
7	14	MS20601AD4W8	RIVET (OR NAS9302B-4-8)
8	4	MS21920-22	CLAMP
9	2	MS21920-25	CLAMP (OR MS21920-24)
10	AR	SCOTCH-WELD DP460	EPOXY ADHESIVE, 3M SCOTCH-WELD
11	AR	PROSEAL 890	SEALANT

GENERAL NOTES:

- MATERIAL: MANUFACTURED FROM D6011-115
FINISHED LENGTH = 112.91±0.020
- FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT CROSSTUBE PER DART QSI 005 4.2
FOR HATCHED AREAS (ZN A6-2), MASK AS REQUIRED
TO APPLY PRIME AND APPLY CLEAR COAT ONLY
- TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- UNITS: INCHES UNLESS OTHERWISE NOTED.
- BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- IDENTIFICATION: SCRIBE DART PART NUMBER "D407-667-245" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- WEIGHT: 27.7 lbs
- PART IS SYMMETRIC ABOUT CENTERLINE.
- RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- BEND PROGRESSIVELY WITH A MINIMUM OF 6 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 8% BASED ON O.D.
- LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- INSTALL D2894-1 CENTER SUPPORT USING A 0.04" TO 0.07" THICK LAYER OF SCOTCH-WELD DP460 PER QSI 015. LET CURE FOR 24 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- INSTALL MS21920-25 CLAMPS WITH D3595-063-430 RUBBER CUSHIONS TO SECURE D2894-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE SUPPORT.
NOTE: MS21920-24 CLAMPS CAN BE USED TO ACCOMMODATE VARYING DIAMETERS. ENSURE THERE IS A MINIMUM OF 1.5 THREADS IN SAFETY ON THE NUTS.
- EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D3190-1 CHAFING SHIELDS AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL PROSEAL D3190-1 CHAFING SHIELDS ONTO CROSSTUBE BY APPLYING A THIN COAT OF PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.
- INSTALL D3190-1 CHAFING SHIELDS SO THAT OVERLAP IS 50 TO 70 DEGREES FROM BOTTOM OF CROSSTUBE OPPOSITE D2894-1 SUPPORT.
- TORQUE CLAMPS 80 TO 100 IN-LB. TORQUE CLAMPS ON D3190-1 CHAFING SHIELD 40 TO 50 IN-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER ADHESIVE HAS CURED FOR 24 HOURS.

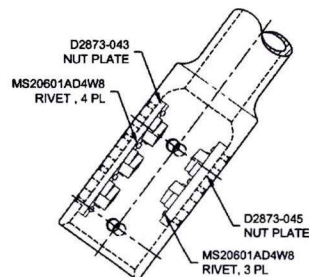
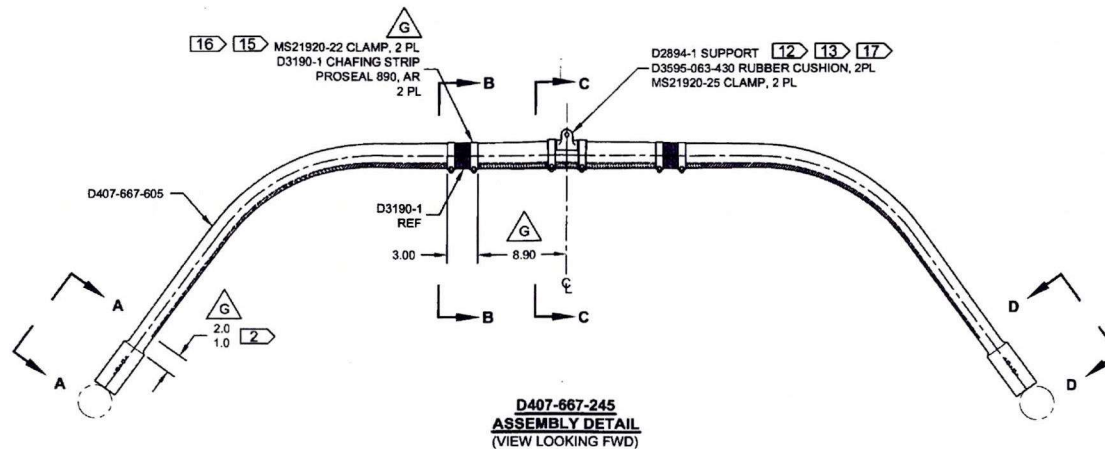
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SUBJECT TO AMENDMENT
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WORK ORDER
NO. 192356 MJS
1903-21

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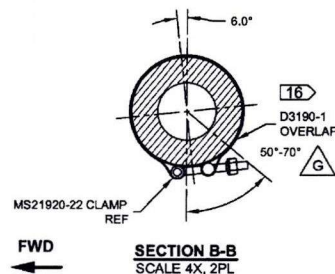
2015 APR 09
UP ECN 15-557

G	INCORP. DEO's D407-667-245-F1/F2 (ZN D8-1, A8-1, D5-2, B6-2, C6-2); 8.90 WAS 8.53 (ZN D5-2); TORQUE REDUCED FOR CHAFING SHIELD (ZN A8-1); FINISH REVISED TO ALLOW MANUFAC. FLEXIBILITY (ZN C8-1)	RF	15.03.20
F	REFORMAT NOTES TO NEW STANDARDS (ZN B8-1); RELOCATED FLAG # 6 (ZN A8-3) PER NCR 210; REMOVED REF. & ADD TOLERANCES (ZN C6-3, C4-3 & D2-3)	RF	08.11.06
E	8.02 AND 8.53 WERE 8.40 AND 8.90 (ZN D5-2); REORGANIZED VIEWS AND REFORMATED DRAWING TO CURRENT STANDARDS. REASONS: CLAMPS MOVED 0.375 TOWARD CL TO ELIMINATE INTERFERENCE WITH AIRCRAFT MOUNTS. REFERENCE: PAR#08-21 AND ECN#1225	MB	08.07.24
D	ADD VIEW FOR OEM SKID HOLES, ROTATE ORIENTATION OF CLAMPS SECTION F-F, REMOVE -851 ABRASION STRIP, ADD MAGNABOND 6398, ADD CUSHION	PH	07.02.07
C	ADD HOLES AND NUT PLATES FOR COMPATIBILITY WITH BHT/AA SKIDTUBES	PH	05.07.26
B	ADD CHAFING SHIELD	CP	03.05.21
A	NEW ISSUE	CP	02.05.13
REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN	RF		
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	15.03.20		

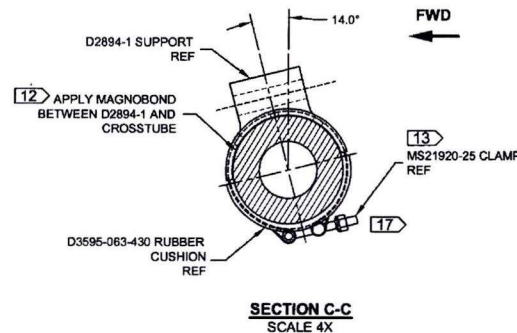
DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWING NO. D407-667-245	REV. G SHEET 1 OF 4
TITLE CROSSTUBE ASS'Y (407 HIGH AFT)	SCALE NTS
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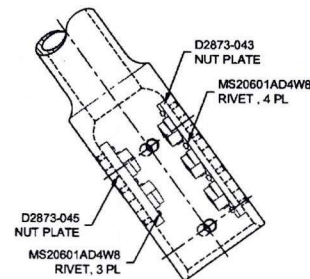
VIEW A-A CUFF DETAIL
SCALE 4X



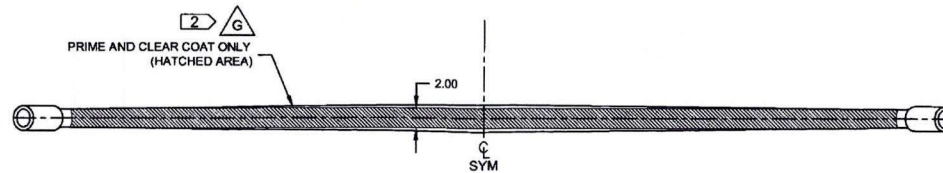
SECTION B-B
SCALE 4X, 2PL



SECTION C-C
SCALE 4X



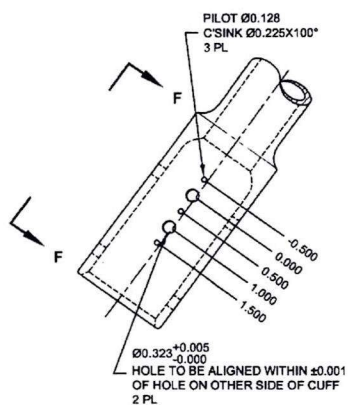
VIEW D-D CUFF DETAIL
SCALE 4X



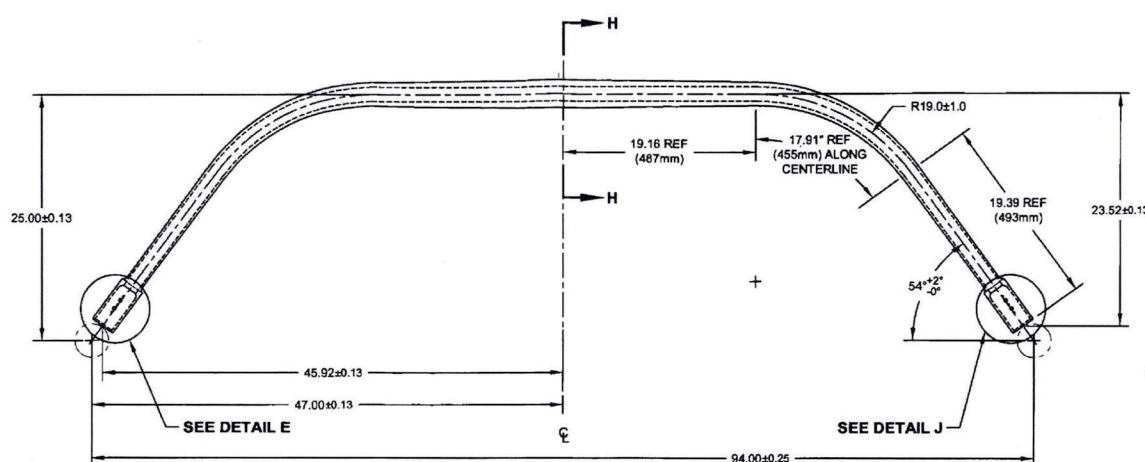
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CHECKED	RF	DRAWING NO.	REV. G
MFG. APPR.	RF	D407-667-245	SHEET 2 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSSTUBE ASS'Y (407 HIGH AFT)	NTS
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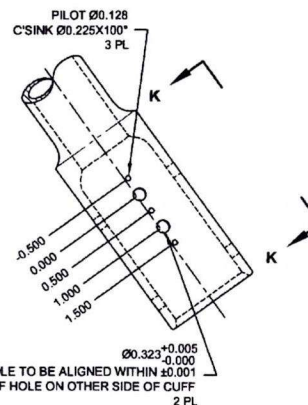
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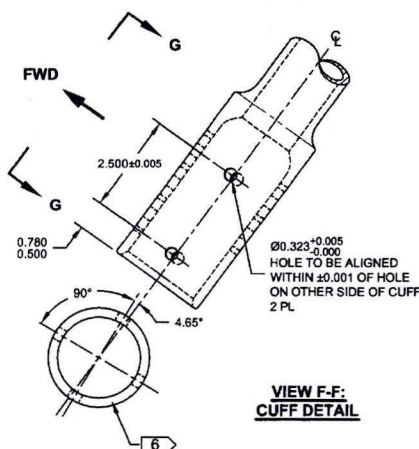
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SCALE 4X
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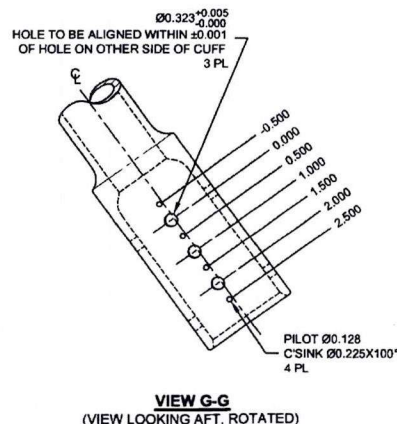
D407-667-605
BENDING AND DRILLING DETAIL
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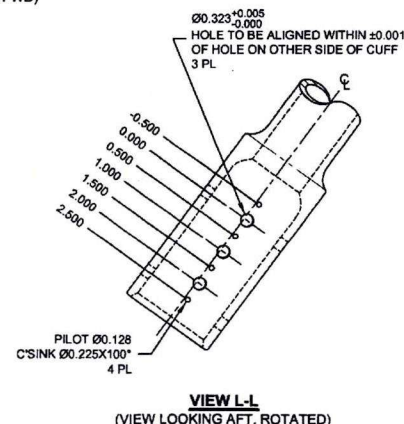
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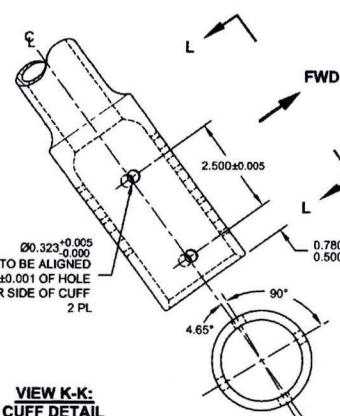
VIEW F-F:
CUFF DETAIL



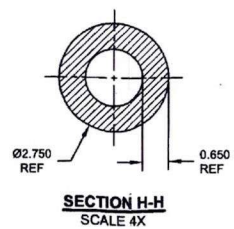
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(VIEW LOOKING AFT, ROTATED)



VIEW L-L
(VIEW LOOKING AFT, ROTATED)



VIEW K-K:
CUFF DETAIL



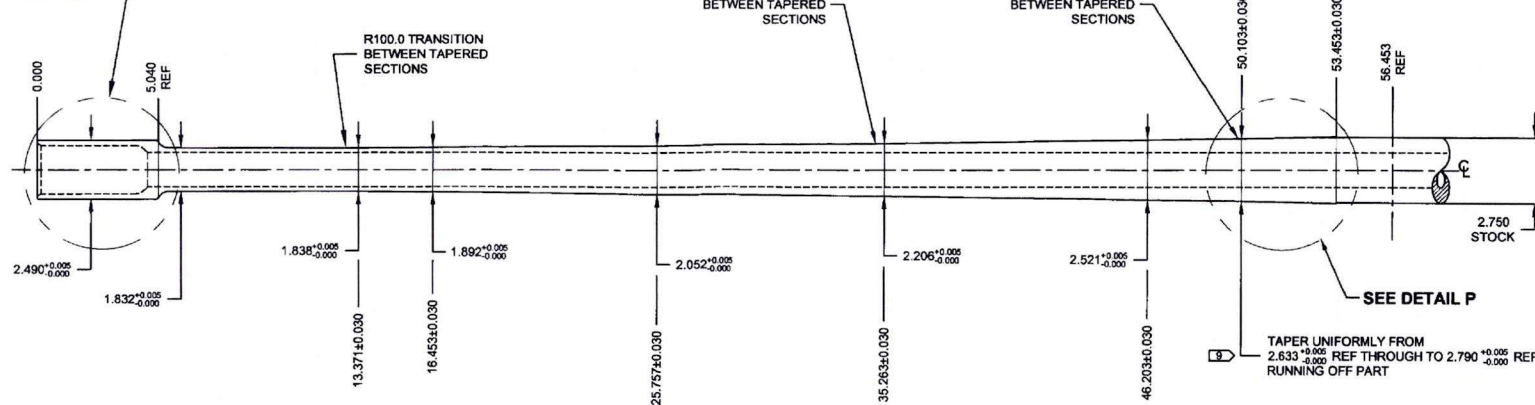
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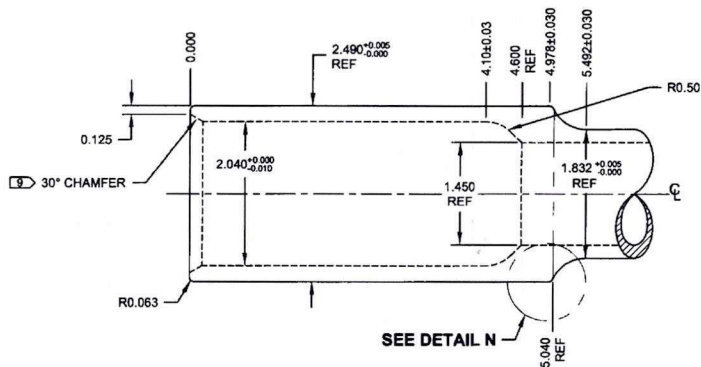
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DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	RF	DRAWING NO.	REV. G
MFG. APPR.	RF	D407-667-245	SHEET 3 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSSTUBE ASS'Y (407 HIGH AFT)	NTS
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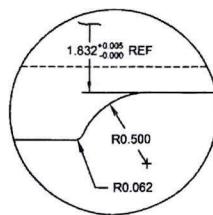
SEE DETAIL M



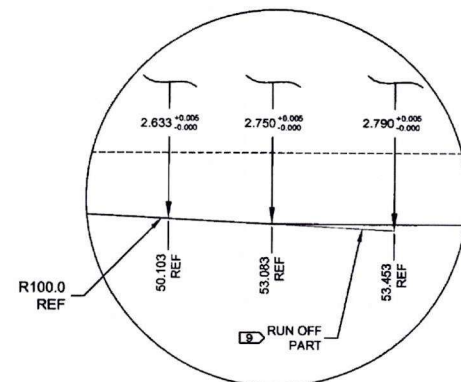
D407-667-245 MACHINING DETAIL



DETAIL M: CROSSTUBE CUFF
SCALE 3X



DETAIL N: CUFF TRANSITION
SCALE 2X



DETAIL P: TAPER RUN-OFF
NOT TO SCALE

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2015 APR 09

DESIGN	47	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	47	DRAWING NO.	REV. C
MFG. APPR.	47	D407-667-245	SHEET 4 OF 4
APPROVED	47	TITLE	SCALE
DE APPR.	47	CROSSTUBE ASS'Y (407 HIGH AFT)	NTS
DATE	15.03.20	COPYRIGHT © 2002 BY DART AEROSPACE LTD	
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Entered: _____ Date: _____



WORK ORDER NON-CONFORMANCE / ROUTE UPDATE

NCR No. _____

Route update only ☐

Job: <u>192357</u> Part No: <u>0407-667-205 TAN</u>	DISPOSITION Rework ☐ Scrap ☒ Use-as-is ☐	DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Large Fab ☐ Cross tube ☒ Small Fab ☐ Finishing ☐ Eng. (Non-AW) ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Engineering ☐ Water Jet ☐ Supplier Quality ☐	
Date : <u>APR 10 2019</u>	Sequence #: <u>100</u>	QTY Affected : <u>1</u>	MRB (QSI042) DAS 9 9-89 <u>19-04-10</u>
Description Work Order Deviation <u>Machined inside cuff out of tolerance 2.040+0.000/-0.010, is now 2.050</u>		Disposition <u>-SCRAP</u>	
		Completed By DAS 66 9-89	
		Lead hand / Supervisor <u>19-04-10</u>	
		QC / QA Coordinator DAS 68 9-89 <u>APR 10 2019</u>	
Root Cause Operator ☒ Manufacturing Process ☐ Equip/Tooling ☐ Handling/Presservation ☐ Material ☐ Product Improvement ☐ Process Improvement ☐ Human Factors ☐ ☐ Pressure/Forced ☐ Bending ☐ Crushing ☐ Cracks ☐ Crimp/Kink/Ripple/Wave/Twist ☐ Marks/Chatter ☐ Mislabeled		FAULT CATEGORY ☐ Contamination ☐ Misaligned/off center ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Incomplete/Unclear Instructions ☐ Drill Holes ☐ Fit/Function ☐ Power Loss/Surge ☐ Folio/Program ☐ Grain Direction ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☒ Off-set/Set-up ☐ Positioned Wrong ☒ Outside Tolerance ☐ Drawing ☐ Finish ☐ Part Lost/Missing ☐ Misread	
Other/Details:			